Sandia one of 'greatest research institutions in the world,' visiting Energy Secretary Steven Chu says

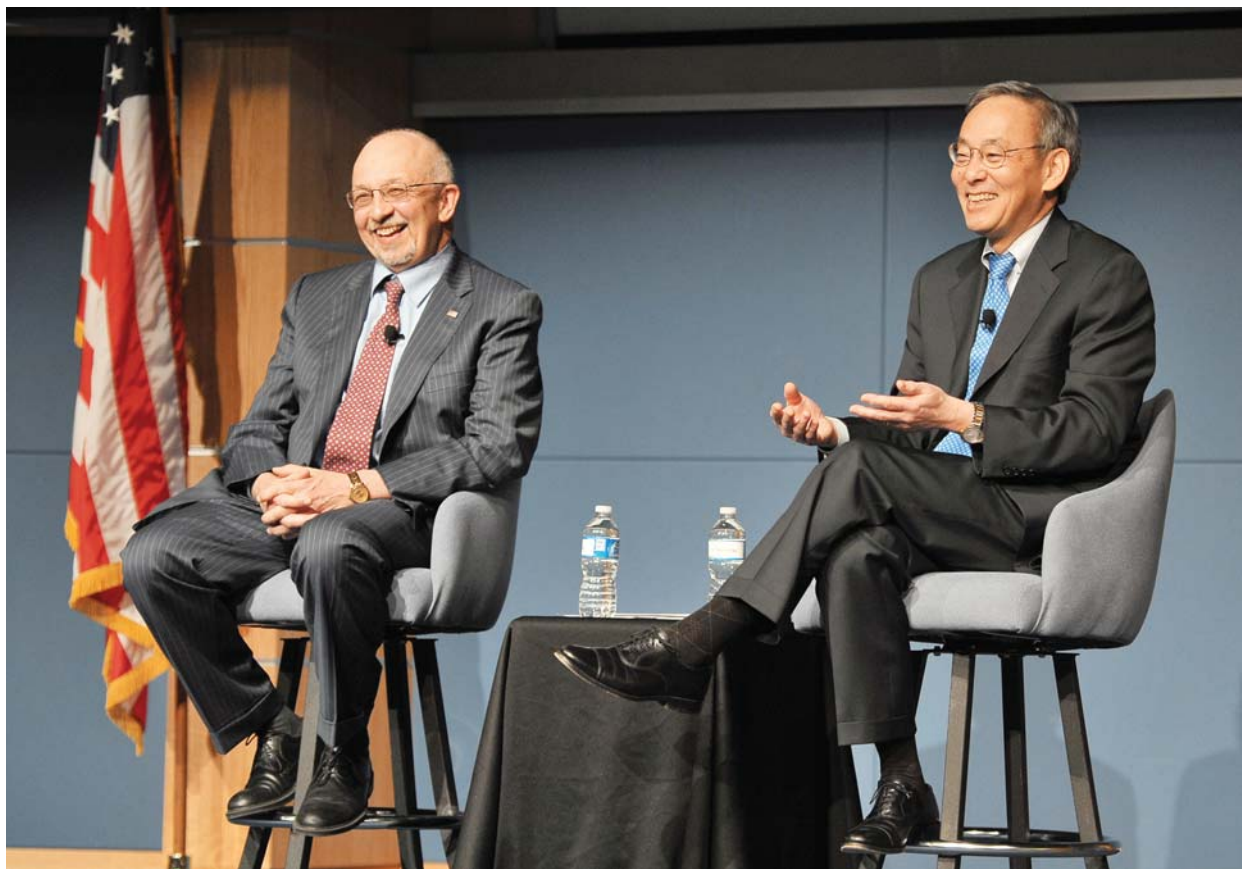
By Sue Major Holmes

Energy Secretary Steven Chu says it's no accident President Obama in his State of the Union urged the nation to look to the federal laboratories and research universities to create the foundation for future prosperity.

Chu visited Sandia and the University of New Mexico on Jan. 26, touring Sandia's National Solar Thermal Test Facility, and learning about solar glitter, Sunshine to Petrol, and similar projects. At an industrial partnership roundtable Chu heard about the Stingray project, Sandia's partnership with Emcore and other local businesses, and the New Mexico Small Business Assistance Program.

The United States has the greatest research organizations in the world, and Sandia is a critical part of that in nuclear security, environmental innovation, research and development, "and broadly for bringing high-technology manufacturing back to the United States," Chu told a town hall at Sandia's Steve Schiff Auditorium, where every seat was taken. Many who could not be seated stayed to watch a video feed of the event in the lobby, and thousands more watched from their desktops.

(Continued on page 8)



SECRETARY OF ENERGY Steven Chu, right, and Labs Director Paul Hommert share a light moment at the Steve Schiff Auditorium during a town hall meeting with members of the workforce. During his late-January visit to Sandia, Chu also toured Sandia's solar facility, conducted a roundtable discussion with Sandia business partners, and conducted a news conference with members of the local media. (Photo by Randy Montoya)

ENGINEERS WEEK® 2012
February 19-25

National Engineers Week is Feb. 19-25

To mark this year's National Engineers Week, Sandia historian Rebecca Ullrich tells the story of the early days of Sandia's environmental testing program, when the Labs' first generation of engineers had to develop entirely new engineering tools to solve problems that had never been encountered. See the story on **pages 6-7.**

Sandia LabNews

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Sandia National Laboratories

Labs' new TotalComp system takes effect April 30

When TotalComp is implemented in April, it will improve workforce hiring, performance, development, and compensation processes at Sandia.

Members of the workforce will still be doing the same jobs in the same buildings but will have more understanding of their current job scope as well as better insight into career paths and options at Sandia. What will change will be job titles and descriptions that today do not consistently reflect what people do and are not aligned with the concept of professional job families.

Steve Rottler, Chief Technology Officer and VP for Science and Technology and Research Foundations Div. 1000, and Pam Hansen Hargan, VP for Human Resources and Communications Div. 3000, talked about the new TotalComp system this week. A timeline for TotalComp, which is replacing Sandia's 15-year-old Integrated Job Structure, accompanies this story on page 4. (For a previous *Lab News* article, see the June 3, 2011, *Lab News*.)

TotalComp

For Q&A's about TotalComp with Div. 1000 VP Steve Rottler and Div. 3000 VP Pam Hansen Hargan, see **page 4.**

Pam says TotalComp should be thought of as an integrated workforce management system.

"TotalComp will position us in attracting, retaining, developing, and rewarding Sandia's most important resource: our people and their talent," she says. "It will give us a structure that is market-referenced and acknowledges and respects the professional experience and contributions of every employee."

The most visible feature of TotalComp will be new job titles and descriptions, organized into job families

(Continued on page 4)

LDRD program open now for project submissions

By Neal Singer

Like ducks, LDRD grants have their season when they're available for bagging, and that season is now: Sandians can submit their ideas from Jan. 23 through Feb. 22.

The coveted Laboratory Directed Research and Development projects are the Labs' sole source of discretionary funding for staff-generated, high-risk, high-potential ideas. It's a large program — approximately 8 percent of the Labs' budget, or $166 million — but getting selected for one is not easy. Because the program offers funds to advance off-the-beaten-path ideas so that researchers don't have to work on their own time — possibly at night out of their home garages — LDRD grants are heavily contested.

(Continued on page 5)

LDRD All-Hands meeting with Div. 1000 VP Steve Rottler

An LDRD All-Hands meeting will be held Thursday, Feb. 9, 1-3 p.m., in Bldg. 858EL, Rm. L2000 (New Mexico) with a video link to 940/1103 (California). Steve Rottler, Sandia's chief technology officer, will provide an overview of the FY13 Laboratory Directed Research and Development (LDRD) program, including the budget, and program and process changes. In addition, representatives from each investment area will describe what is emphasized in their LDRD call. This is an open forum with an opportunity to ask questions and engage with the LDRD leadership team. For more information, contact Sheri Martinez (1911) at 844-8145

Inside

AAEOY

ALBUQUERQUE is hosting the 2012 Asian American Engineer of the Year award ceremony, and Sandians are playing a big role in organizing the event 10

and . . .

Marking National Black History Month:
Sandia forges links to Historically Black Colleges. See **page 9.**

That's that

It's always a privilege — even if a little nerve-wracking — to host a Secretary of Energy. I know in our group, Media Relations and Communications, there was definitely some scrambling in the two or three days leading up to Energy Secretary Steven Chu's visit in late January — and our role was only peripheral. Sort of like getting your house ready for a Christmas party — everything looks great, but maybe it wouldn't hurt to bring in the carpet cleaners one more time. During his visit, Secretary Chu was all business, as you would expect of a Nobel laureate who also happens to head up the US agency charged with maintaining the national nuclear weapons stockpile. Elsewhere in this issue, you can read about the secretary's town hall meeting with employees, his tour of Sandia's solar facilities, and his news conference with members of the local media. What probably doesn't come through in those stories is that, besides being a serious and accomplished man, Secretary Chu can also be darned funny.

For example, during the town hall meeting, an employee asked him how DOE expects to attract the best and brightest tech employees when it has to compete with the likes of Google and Facebook, both known to offer generous compensation packages.

"I know Google very well," Chu responded. "If Google wants you, they can offer salaries and perks and all sorts of things that no government agency can actually offer. The good news is that Google offers you free food, an excellent cafeteria, and the first thing employees do when they go to Google is, they gain 15 pounds. So you're spared from that." The full house at the Steve Schiff Auditorium, of course, broke out in spontaneous laughter. Chu then became serious again, noting the many compelling reasons to work in a national laboratory tackling issues that have national and global significance. "So think about what you guys are doing (at Sandia). This is a good thing," he said.

* * *

There was a lot of talk during the secretary's visit about alternative, clean energy sources, primarily solar and wind. Sandia is doing important work in those areas. But I wonder if there's a sleeping giant in the alternative energy arena. We have a story in an upcoming issue highlighting Sandia's work with the US Navy on a geothermal test project. For a lot of technical and practical reasons, geothermal has not caught on in a big way except in places like Iceland, but there's no denying that right beneath our feet there is a source of energy that is, for all practical purposes, limitless. In addition to its abundance, geothermal has the advantage that it doesn't require the storage solutions that solar and wind demand. The sun doesn't shine and the wind doesn't blow all the time. But geothermal potential is always there. Surely, in our calculations about a post-fossil fuel economy (decades away though that may be), geothermal deserves a place at the table.

* * *

We were all riveted, along with the rest of the world, by the tragic sinking of the *Costa Concordia* off the coast of Italy. In the wake of the accident, the CEO of a competing cruise line sent out an open letter to his company's customers. After expressing deep condolences for the passengers and crew who lost their lives, he made a point that struck a chord with me and surely has relevance for Sandia.

In assuring his customers that they can continue to feel safe on his company's ships, he wrote, "Our chairman . . . has said there's no such thing as perfect safety, but there is such a thing as perfect dedication to safety. And that's what we strive for daily." I like that: A perfect dedication to safety.

* * *

Language is such a marvelous, malleable thing. I heard a traffic reporter on the radio the other day talking about "a very busy slowdown" someplace near Paseo del Norte and I-25. Can things be both busy and slow? In English, apparently so, because the listeners knew exactly what she meant.

Then there was that traffic accident last week you may have heard about. Two trucks loaded with a thousand *Roget's Thesauruses* collided as they left a New York publishing house. Witnesses were stunned, startled, aghast, taken aback, stupefied. (As a word junkie, I just had to pass that gag along.)

See you next time.

Bill Murphy (505-845-0845, MS 0165, wtmurph@sandia.gov)

John Maenchen named IEEE Fellow; recognized for pulsed power work

John Maenchen (1212), Sandia's representative on the NNSA Defense Programs Science Council, has been named a Fellow of the Institute of Electrical and Electronics Engineers. He is being recognized for leadership in the development of intense pulsed charged particle beams and their application for flash radiography.

JOHN MAENCHEN

"This award is well-deserved recognition for John Maenchen's leadership in science, technology, and effects of nuclear weapons through a continuing study and use of plasma physics," said Don Cook, NNSA's deputy administrator for Defense Programs. "Being named an IEEE Fellow is a tremendous honor and demonstrates John Maenchen's extraordinary accomplishments."

The grade of Fellow is conferred by the IEEE board of directors upon a person with an outstanding record of accomplishments in any of the IEEE fields of interest. The total number selected in any one year cannot exceed one-tenth of 1 percent of the total voting membership. This year, 321 individuals have been elevated to IEEE Fellow.

John came to Sandia immediately after earning his doctorate in electrophysics from Cornell University in 1983. As both a scientist and manager at Sandia, he advanced science, technology, and engineering through the design and construction of pulsed power accelerators; the invention and development of new intense electron-beam, ion-beam, and z-pinch loads; the modeling and theory of their operation; the invention of diagnostic approaches to investigate their performance; and the invention and development of new government and commercial applications for these capabilities.

In this time he initiated a resurgence in pulsed power-driven flash radiographic technologies, leading an international team to significantly advance the state of the art. This body of achievement was honored with the 2009 IEEE Nuclear and Plasma Science Society Pulsed Power Science and Technology Committee's Peter Haas award.

Subsequent to these activities, John managed the Nuclear Weapons Science and Technology Program's international strategic planning, the site deinventory of special nuclear materials, and the Readiness in Technical Base and Facilities portfolios. Since 2009 he has served in his current role at NNSA.

Recent Patents

Note: Patents listed here include the names of active and retired Sandians only; former Sandians and non-Sandia inventors are not included. Following the listing for each patent is a patent number, which is searchable at the US Patent and Trademark Office website (www.uspto.gov).

* * *

Juan-Carlos Jakaboski (5944), and Steven Todd (5437): Fluid Blade Disablement Tool. Patent No. 8,091,479.

Ihab El-Kady (1725), and Roy Olsson (1719): Photonic Crystal Devices. Patent No. 8,094,023.

John Roskovensky (5717), Prabal Nandy (5717), and Brian Post (5513): Thermal Wake/Vessel Detection. Patent No. 8,094,886.

Dennis Roach (6620), Kirk Rackow (6624), Joseph DiMambro (2127), Ciji Nelson (1522), and David Moore (1522): Ultrasonic Probe Deployment Device for Increased Wave Transmission and Rapid Area Scan Inspection. Patent No. 8,087,298.

Saundra Monroe (1825), S. Jill Glass (1825), Donald Susan (1831), Ronnie Stone (2718, Ret.), and Jamey Bond (2614): Method for Hermetic Electrical Connections. Patent No. 8,082,663.

Yijiang Song (1815, Ret.), John Shelnutt (1815, Ret.), and Craig Medforth (1112, Ret.): Synthesis of Metallic Nanoshells on Porphyrin-Stabilized Emulsions. Patent No. 8,075,664.

Gregory Bogart (1718), and Robert Grubbs (1832): Nanostructure Templating Using Low Temperature Atomic Layer Deposition. Patent No. 8,080,280.

Michael Dugger (1831), and James Ohlhausen (1822): Method for Lubricating Contacting Surfaces. Patent No. 8,071,164.

Katherine Simonson (5511), and Tian Ma (5511): Estimating Pixel Variances in the Scenes of Staring Sensors. Patent No. 8,103,161.

Sandia LabNews

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Maynard Holliday named volunteer of the year by Citizen Schools

By Patti Koning

Once a week, Maynard Holliday (8112) turns his engineering and robotics expertise away from national security issues and toward another critical cause — middle-school students. For the past two years, Maynard has served as a volunteer teacher at Oakland's Elmhurst Community Prep Middle School, leading an afterschool robotics program through Citizen Schools. Last month, Citizen Schools California named him Volunteer of the Year.

"I'd been teaching robotics for over a decade, but always in a onesy, twosy fashion; a lecture here, a workshop there," he says. "I was drawn to Citizen Schools because they had a structure that could impact STEM (science, technology, engineering, and math) principles. I'm paired with a classroom teacher who helps with classroom management."

Citizen Schools is a national nonprofit organization that partners with middle schools to expand the learning day for children in low-income communities. The organization uniquely mobilizes thousands of adult volunteers like Maynard and his co-teacher Wiley Neel (8125) to help improve student achievement by offering skill-building apprenticeships after school.

Macy Parker, Elmhurst Community Prep campus director, describes Maynard as an amazingly dedicated volunteer who has opened new doors for students.

The kids are enthusiastic

"Over the last two years, he has led our 6th graders in not only learning how to build, program, and exhibit robots, but also how to think about broader possibilities for their own futures," she says. "Our students had never met a robotics engineer. They didn't know that this kind of job was possible, or that their love of figuring out how things work was connected to a job called 'engineer' or to the things they do in math class."

It's too early to tell what kind of an impact Maynard's classes are having, but the kids are enthusiastic. He also feels he's making a difference in other ways.

"Because it's Oakland, those students don't see many people of color in math and science," he says. "It's important to me that the kids see that reflection."

Maynard was first exposed to robotics while an undergrad at Carnegie Mellon University in Pittsburgh. In the aftermath of the nuclear meltdown at Three Mile Island in Dauphin County, Pa., the university established a Robotics Institute with funding from Westinghouse Corp. Maynard worked with a professor who was tasked with designing robots to explore the contaminated reactor.

His interest in engineering, however, goes all the way back to childhood. A self-described "Trekkie," Maynard's childhood dream was to become an astronaut, and engineering was a way to get there. In pursuit of this aim, he won scholarships to Stanford University, where he earned a master of science in mechanical engineering design, and the International Space University in France.

He came within arm's reach of his dream in 1994 and 1996, when he was a finalist for the US Astronaut Corps. In 1996, he was a finalist with Rick Husband and William McCool, who would go on to become the commander and pilot of the Space Shuttle *Columbia*. Both men died in the 2003 disaster. Maynard withdrew his application from NASA at that point.

He spent 16 years as a robotics engineer at Lawrence Livermore National Laboratory. In the late 1990s, he assembled and led the joint DOE/NASA International Pioneer Project Team that designed and fabricated a radiation-hardened telerobotic mobile vehicle for site characterization and remediation tasks at Chernobyl unit 4. After several years in the private sector, he joined Sandia in 2011 and works in the Systems Analysis Group on Domestic Nuclear Detection Office (DNDO) projects. "I've been fortunate to attend top-notch universities and work at very good jobs," says Maynard. "My credo is you learn it, earn it, and return it."

He encourages his co-workers to consider volunteering for Citizen Schools. "It gives you the opportunity to take what you do best in your career or personal pursuits and use it to help middle-school students move to a long-term trajectory of success," he says. "I feel fortunate that Sandia supports this kind of volunteer work through the 40 hours of time you can charge."

LEARN IT, EARN IT, RETURN IT — Every week, Maynard Holliday teaches a robotics class to students at Elmhurst Community Prep Middle School in Oakland, Calif. For him, it's a way of giving back and serving as a role model. (Photo courtesy of Citizen Schools)

Volunteers teach for an hour and a half one afternoon a week at schools in Oakland, Redwood City, East Palo Alto, or Campbell. For more information, contact Maynard at 925-294-6344 or visit www.citizenschools.org/volunteer/.

Sandia CaliforniaNews

Developing an Awareness, Training, and Exercises model guidelines document is a global effort

By Patti Koning

During the past year, a team from the US Department of Homeland Security's Domestic Nuclear Detection Office (DNDO) and Sandia, including Chad Haddal (8112), Stacy Mui (8112), and Jason Reinhardt (8111), has been hard at work on a guidelines document on Awareness, Training, and Exercises (AT&E) related to nuclear detection. This AT&E guidelines document is the first in a series on the enhancement and sustainment of Nuclear Detection Architectures (NDAs) for the Global Initiative to Combat Nuclear Terrorism (GICNT).

While the DNDO and Sandia staff facilitated the creation, review, and revisions to the document, the actual writing was handled by an international drafting group made up of 16 partner nations and the European Union.

"This was truly a remarkable process," says Stacy. "The development of a global NDA is a huge, complex issue and no one country has the answer. By bringing everyone to the table and giving everyone a voice, we've created a valuable resource — the document — and are also continuing an ongoing, international conversation and collaboration on nuclear and radiological detection."

The guidelines document is a direct result of the collaborative discussions at the GICNT Nuclear Detection Working Group (NDWG) session on Education, Training, and Exercise (ET&E) held last spring in Córdoba, Spain (see the June 3, 2011, issue of *Sandia Lab News*). In October, the DNDO and Sandia team planned, organized, and facilitated a follow-up workshop in Zadar, Croatia, that focused on the technical review of the draft AT&E guidelines document.

"With this last workshop in Zadar, we set out to embrace and reward leadership and collaboration by international partners because we thought this would facilitate greater stakeholder buy-in by these partner states," says Stacy. "I think this approach was well received."

The Zadar workshop included speakers and discussion co-facilitators from multiple countries, as well as technical experts from 16 countries and the European Union. These partner nations contributed content to the document draft, thereby expanding the level of international collaboration from previous efforts where the US played a larger role in authorship.

Another change was to include more anecdotes in the guidelines document. "At the Córdoba conference, we found that countries really wanted to talk about themselves — to share what is working and not working in their country and their particular challenges, rather than just talk about higher-level principles," says Stacy. "So we embraced this in the guidelines document and used anecdotes to illustrate the application of NDA principles."

This approach to multilateral collaboration is already having an international impact that goes well beyond the drafting of this document. The International Atomic Energy Agency (IAEA) is in the final stages of adapting the *Model Guidelines Document for Nuclear Detection Architectures* as a publication in its Nuclear Security Series.

The *Model Guidelines Document* (published as a GICNT product in 2009) was the collaborative effort that originally launched the document series on NDA enhancement and sustainment. Based on the well-received document drafts, discussions have already begun on incorporating the AT&E document into the IAEA Nuclear Security Series.

Working in close partnership, Sandia and DNDO have demonstrated that truly collaborative multilateral participation, agreement, and coordination can be achieved by engaging all international partners as equals. Furthermore, the Sandia and DNDO team will work with United States Central Command (CENTCOM) to conduct a tabletop exercise on nuclear detection and interdiction with the United Arab Emirates later this spring.

Going forward, the IEP team will lead the adjudication of workshop comments and edits, as well as prepare the final AT&E guidelines document for the 2012 IAG meeting in Marrakech, Morocco, from February 13-16. In addition, the discussions in Marrakech will launch the second document in the NDA series on "Planning and Organization" relative to Rad/Nuc detection.

New TotalComp system ready for April rollout

(Continued from page 1)

that reflect the scope and responsibilities of the job employees are assigned to perform. These titles and descriptions have been fine-tuned over the past year to reflect the knowledge, skills, and abilities required by the position. A team of directors and senior managers partnered with the TotalComp team to ensure accurate and consistent use and assignment of job descriptions and families across the Labs.

The pay employees receive for their contributions in their respective roles will be directly referenced to what others earn who do similar work across Sandia and at the companies and labs with which Sandia competes for talent. Pam adds that no employee will see a reduction in pay when the system takes effect.

"Another important aspect preserved in the system is the tradition of mobility for Sandians in filling a wide variety of jobs during their careers," she says. "With clear, well-defined job descriptions, employees will have significantly more information to guide decisions about career development as they seek new career and learning opportunities within Sandia."

The traditional Sandia job levels — member, senior, principal, and distinguished — will be retained in the new system, as well as pay differences between those levels. This integrated system will eliminate the administrative and technical job ladders for all levels of non-represented employees. In their place will be job families and a number of salary bands within each family.

Although planning and design of the TotalComp system began in 2009, the first actions came about in fall 2010, when managers initially assigned employees to a job description that was most appropriate to their work. Next, a cross-divisional review examined whether job assignments were consistent from one organization to the next, followed by a second look by management and further revisions to the job titles and descriptions. In late 2011 and into January 2012, an independent review was completed to ensure consistency across the Labs. TotalComp will provide a system that is market referenced and acknowledges and respects the profession of every employee.

"During the months of discussion about TotalComp, managers and employees raised many questions about where the line will be drawn between the single R&D job family and other job families, such as project management or information technology," Steve says. "Positions in which technical judgment drives research and engineering development typically will be assigned to the R&D job family."

The R&D job family includes much of the technical work at the Labs, including basic and applied research, and engineering development, Steve says. However, not all technical jobs are within the R&D job family. For example, information technology that supports many facets of the laboratory is a separate and distinct job family — we want to honor the unique role and characteristics of these jobs.

Employees will receive notification of their job family assignment and job description beginning the week of March 12. Employees who feel their job assignment doesn't generally match what they do, can request reconsideration during a two-week period — March 26-April 6. A review of all reconsideration requests will begin April 9.

Special appointments will continue for distinguished and senior levels in all job families to recognize sustained outstanding achievement and impact by employees.

Pam and Steve recently discussed some of the major questions about TotalComp with the *Lab News*. Their comments are in the Q&A story at right.

TotalComp: A Q&A with HR VP Pam Hansen Hargan and Chief Technology Officer and VP Steve Rottler

Lab News: *Do you think that the changes coming with TotalComp will produce concern among the members of the workforce?*

Pam Hansen Hargan: I realize that any change in Sandia's workforce systems and particularly compensation, because it has been in place for so long, will generate different perspectives and a variety of emotions. It is important to understand that the basis of the new system is so Sandia can shape the workforce to meet our mission and mission support objectives today and well into the future. In other words, this will enable our continued success as a national lab while at the same time honoring our people and their varied professions.

LN: *Why are we doing this?*

Steve Rottler: Our current job structure system has undergone many changes during the 65-year history of the Laboratories. The most recent significant change occurred in the 1990s when we created today's Integrated Job Structure. Many elements of our current system have been with us for decades, and it is the only job structure system many, if not most, of us have experienced.

When I was first presented with the TotalComp concept more than two years ago, I instantly resisted it because it was such a departure from the only system I have known over the course of my 27 years at Sandia. Since then, as I've become more familiar with the issues created by our current system, and the details of TotalComp, several factors have convinced me we must move away from our current system. A key factor that drove me to change my mind was the realization that the evolution of our current system over multiple decades has led to vulnerabilities and inconsistencies that threaten the integrity of our market-based compensation philosophy.

STEVE ROTTLER

In addition, I have come to understand that our current system is inconsistent with practices in use by peer organizations with which we compete for talent. These and other factors made it evident to me that for the good of the laboratory we needed to lean into the discomfort of moving away from a system with which we have become comfortable and adopt proven practices that will allow us to do a better job of recruiting and retaining talent, managing career development, and managing performance and compensation.

Change is scary, especially when it comes to changing something so fundamental to the social contract each of us has with the Laboratories. However, successful, high-performing organizations view change as a fact of life, even a necessity, in remaining viable and competitive. After two years of deep engagement in the development and implementation of TotalComp, I have come full circle in my opinion about the new system, and now view it as an essential step in our continued growth and maturity as a world-class institution.

I don't for a minute underestimate the challenge we will face in managing the implementation of TotalComp, but I also have absolute confidence in our ability to succeed in doing so.

LN: *What is the short description of how we got to the TotalComp system?*

PHH: It was clear that our current system was outdated and that we needed a comprehensive systems approach to workforce management to be more competitive and more responsive to business and market conditions. Throughout the many months of planning, we have been guided by the principles that the executive team set forth in their original meetings. After a great deal of dialogue at the executive level, input from other employers who have reformed their own job classification and compensation systems, and many discussions across all Sandia's divisions, we are fully implementing an updated integrated workforce management system in April. I would add that over the past decade, most high-tech businesses and labs, including our NNSA sister labs at Los Alamos and Livermore, have adopted similar comprehensive approaches to workforce management.

PAM HANSEN HARGAN

LN: *How will the various elements of TotalComp work?*

PHH: First of all, Sandia's management based their thinking on the Labs' core values. For the employee, the paramount issues were respect for people's professions, providing more career development opportunities, retaining and engaging our staff, and the need for a stronger performance management system that equitably rewards work, not credentials.

The new system will allow us to more accurately identify trends and address market inequities by job, since each job will be individually placed into a market band that is driven by market. Maintaining and bolstering our ability to attract talent is a foremost consideration in designing any compensation system, and it certainly was a key factor in TotalComp. It's important to understand why we call it TotalComp. It's a system of systems, in which a great many important aspects of job classification, movement, career development, and compensation are covered by the same set of principles.

For example, let's look at the two areas of interest to every member of the workforce, pay and performance. Today, in jobs where we're competing heavily such as cyber-security, salary exceptions are the rule. And employee performance ratings today are calibrated against others in very different professions. That is not the best approach, to say the least.

LN: *What exactly is wrong with our current system?*

SR: While I understand the motivation behind this question, I think the question we need to ask is not "what's wrong" but rather "is the structure in place today serving us well and is it appropriate to the challenges we face going into the future?" I am now convinced the answer to this question is "no." Our current job system has evolved over multiple decades in response to a variety of different needs and drivers. This has led to vulnerabilities and inconsistencies that threaten the integrity of our market-based compensa-

(Continued on next page)

LDRD open for project submissions

(Continued from page 1)

Submitted ideas should fall within these bounds: They must improve the Labs' ability to enable Sandia's missions while advancing the frontiers of science and engineering. The ideas must be relevant to Sandia's national security missions.

The quality and leading-edge character of the LDRD portfolio is validated by peer review boards.

While small-step advances have their place in LDRD funding, it's worth noting that game -changing efforts are welcomed as well.

As proof, LDRD investments have played a role in 68 percent of the Labs' recent R&D 100 awards. Winners selected in this much-watched contest consistently involve considerable advances in research and development.

LDRD funding this year falls into five areas: research foundations ($50.5 million), mission challenges ($6.3 million), mission technologies ($50.6 million), grand challenges ($22.6 million), corporate investments, including early-career R&D (capped at 20), program management, and corporate reserves ($36.1 million).

"Much of the program is similar to last year," says Research Strategy & Partnerships Center 1900 Director Julia Phillips, "with the most significant changes occurring in the ST&E Foundations area."

What's New in the FY13 LDRD Program?

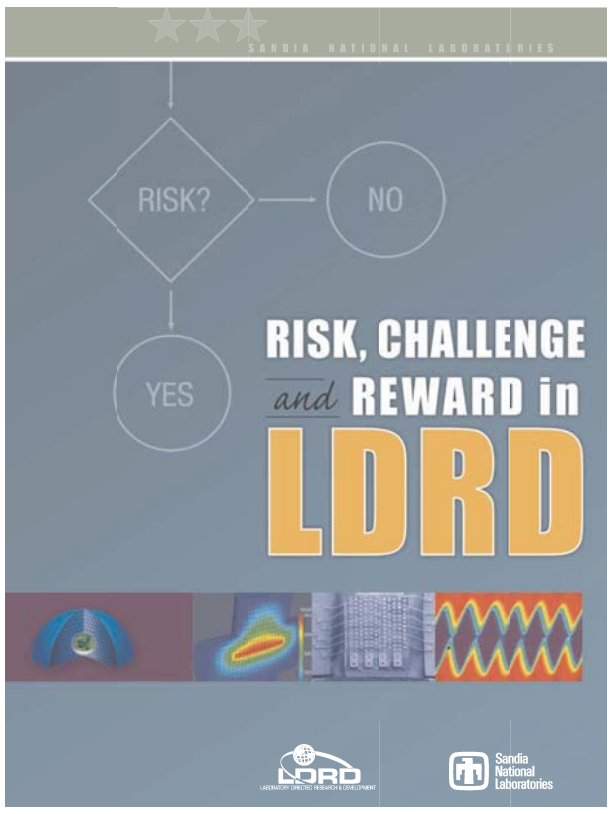
The ST&E Foundations program area has been changed to align with Sandia's Research Foundations. Accordingly, this program area is now called the Research Foundations program area and is divided into the following investment areas:

- Bioscience
- Computing and information sciences (formerly computer and information science)
- Engineering science
- Geoscience (new research foundation)
- Materials science (formerly materials science and technology)
- Nanodevices and microsystems (formerly microelectronics and microsystems)
- ¨• Radiation effects and high energy density sciences (formerly pulsed power)
- New ideas (new investment area)

The experiment of anonymous submissions for ideas has been eliminated, due to negative feedback from principal investigators and investment area managers.

Additional details about the investment areas, as well as the overall LDRD process, can be found on the internal LDRD website (https://ldrd.sandia.gov/cgi-bin/WebObjects/LDRDMain.woa/wa/).

Questions about the LDRD process or the FY13 call can be answered by Hank Westrich (505-844-9092) or Sheri Martinez (505-844-8145).



RISK AND REWARD — This 2010 brochure published by Sandia's Laboratory Directed Research and Development program office addresses the subject of investing in high-risk, high-potential ideas.

TotalComp Q&A

(Continued from preceding page)

tion philosophy. For example, the current system potentially leads us into situations where it is possible to have individuals doing the same job but, because they carry different job titles, they could have different opportunities or compensation. We all should view this as unacceptable because it violates at least one of our five values — respect for the individual.

LN: *What would you say to staff members who may disagree with implementing TotalComp?*

SR: For those of you who don't understand yet why we must deploy this new system or who are feeling vulnerable or frustrated, I want you to know that we have traveled the road you are now traveling. Such feelings are legitimate, and we are not asking you to simply surrender them and march forward with a smile on your face.

I don't believe I have ever been involved in a decision about a more complex topic, something so fundamental to the social contract between each of us and the Laboratory. This is a change that we have studied, discussed, and debated both deeply and thoroughly for almost two years, and after all that, we have reached a decision that we will implement TotalComp at the end of April.

"Our success in this undertaking depends critically on the constructive engagement and support of every employee."

I believe one of the only things in life over which each of us has complete control is how we present ourselves and how we react in a given situation. Each of us has such a choice to make with respect to the implementation of TotalComp. If you are feeling confused or frustrated by this impending change, please express your concerns, seek information, and ask questions of the TotalComp team, me, or anyone else in management, and don't stop until you have the clarity of understanding you need. If you already have all you need to move forward, please be a positive force by lending a hand to those who have questions or need additional information.

It is essential that this change be accomplished successfully, and it will not occur on the day we launch TotalComp — it will happen over time as we learn to manage in the new system. Our success in this undertaking depends critically on the constructive engagement and support of every employee.

LN*: Why is R&D treated differently under the new system, with only a single job family?*

SR: This was a difficult decision reached only after an extended debate and much discussion. In the beginning, many of us were uncomfortable with the idea of R&D being a single job family because it felt inconsistent with our Laboratories' values to manage one profession different from all other professions. During our discussion of this topic, we kept returning to the question of which approach would best enable us to be successful in executing our mission.

Each and every profession at Sandia is vital to the execution of our technically driven mission. We concluded that it is essential for us to retain the flexibility to move employees within the R&D job family to successfully execute our mission. And that's even more critical today given the increased diversity of our work.

This view was validated by data showing most employee transfers between professions occur between the professions that will comprise the R&D job family, where it is common for employees to move from one kind of research or engineering development position as projects come and go.

LN: *What should Sandians take away from the information about TotalComp that was presented last May and in the upcoming sessions with their managers in early March?*

PHH: This is an opportunity for all members of the workforce to get involved and understand why this will make the Labs stronger and aid recruiting by aligning jobs and compensation with the market. Finding and encouraging the next generation of Sandians should be something everyone cares about. I really hope everyone takes full advantage of the upcoming opportunities to discuss with your managers the full range of improvements that TotalComp will bring. Think about how you can use this system to make your own department stronger and make Sandia more competitive on the national stage.

LN: *When will Sandians see their job titles and descriptions?*

PHH: Sandians will see their job titles and descriptions after March 12, and the system goes into effect at the end of April. However, beginning the week of March 5, there will be an opportunity to participate in a meeting with your division leadership teams to learn more detail about the integrated workforce management system and engage in dialogue before job descriptions are shared.

Sandia Women's Action Network hosts 'New Year, New You' presentation

Gabrielle Sarfaty, a behavioral specialist in Sandia's Health and Employee Benefits (HBE) organization, spoke at the *New Year, New You* event — sponsored by Sandia Women's Action Network (SWAN), in partnership with HBE — in the Schiff Auditorium on Tuesday, Jan. 31.

Her talk, *Building Personal Resilience*, was intended to provide tools and strategies to help employees deal with challenges in a healthy way.

Resilient individuals, Gabrielle said, are better able to handle the stress in their lives. Connecting with personal values and beliefs, and connecting with others, are two good strategies for increasing personal resilience, she told her audience.

Gabrielle also noted that individuals don't always recognize their own power to change how they are impacted by outside situations and forces, and how they in turn can have an impact on those situations.

SWAN Council co-chair Esther Hernandez says the group's focus is to create a welcoming environment for all women at Sandia. SWAN membership is open to all Sandia members of the workforce, and everyone is welcome to attend its events and meetings.

View the presentation, and learn more about SWAN by visiting its Sharepoint site at https://sharepoint.sandia.gov/sites/New_SWAN/default.aspx. — *Stephanie Holinka*

ENGINEERS WEEK® 2012
February 19-25

TESTING, TESTING

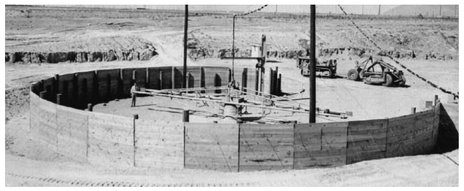
Inventing nuclear weapon environmental testing in the 1950s

Bldg. 828, Sandia's first mechanical test lab and home of environmental test, shortly after it opened in 1946.

Setting up a vibration test in Tech Area 3, 1958.

National Engineers Week, February 19-25

National Engineers Week was established by the National Society for Professional Engineers in 1951 to increase public awareness of engineering's contributions to society. Sandia was established as an engineering laboratory and Engineers Week is appropriately celebrated here. This article focuses on the early history of Sandia's environmental test capability, not because it is more or less important than most of the Labs' other functions, but because it is one of the places where the depth and breadth of engineering skill and creativity is physically apparent.



The rocket-powered centrifuge under construction in 1952. In operation for a few years and dormant for over five decades, the old centrifuge is now being removed as part of the erosion control effort in Tijeras Arroyo. A historic facility, it has been fully documented and its pedestal and related parts preserved for potential use in a future display or sculpture.

Story by Sandia Historian Rebecca Ullrich • Photos from Sandia archives (Myra O'Canna, archivist)

The large test facilities in Sandia's Tech Area 3 easily capture the imagination of visitors. Even recognizable test instruments, like centrifuges, become puzzles to the uninitiated eye at the scale of those built in Sandia's backyard. On one visit, DOE's chief historian observed that when he was landing in Albuquerque he felt like he was flying over a massive abandoned amusement park. Because they are intriguing, the facilities have been regular stops on visitor and family day tours over the decades. But they are much more than entertainment — They are just the most visible and striking of Sandia's extensive, decades-long adventure in Environmental Test.

When Sandia's precursor, Z Division, formed at Los Alamos in the summer of 1945, it gathered together key nuclear weapon ordnance engineering activities, including design, testing, assembly, and military liaison. It began moving down to the current Sandia/New Mexico site near Albuquerque in the fall of 1945.

One of the first facilities erected for the new division was Bldg. 828, mechanical test. Completed in 1946, the structure housed a variety of test equipment, including shake tables, a pendulum for mass gravity measurements, and a cold chamber. There was an emphasis on climate in the early testing efforts — in addition to temperature chambers, Bldg. 828 held a salt fog chamber and various altitude chambers. Most equipment was purchased from commercial producers; as basic environmental testing, it looked very much like any large industrial concern's product testing capability. There was just more of it and the anticipated environments the product faced were extreme.

Capabilities grew as Cold War deepened

Z Division and its environmental test capability grew rapidly in the immediate post-war period. As the Cold War gained traction, the US pursued a war reserve stockpile of nuclear weapons. Testing pushed beyond Bldg. 828 for tests that were too numerous or too large to fit inside. In 1949, Bldg. 860 opened and new test equipment was brought in. Still it was not enough and Test also occupied Bldg. 864 in 1957.

While the test facilities multiplied in Tech Area 1, testers occasionally used other locations for larger or more hazardous tests — taking advantage of the large swath of land to the south, where proximity fuze development testing went on during World War II. Tests also were designed for remote locations to take advantage of particular climate characteristics. Running from 1951 through 1955, Operation Deep Freeze aimed to test barometric fuzing on non-nuclear test devices in the extreme cold of minus-45 degrees F. Field test personnel traveled to Upper Red Lake, Minn., in the winter to conduct height-of-burst tests.

Closer to home, with the Honest John warhead design ready for testing in 1952 and no extant centrifuge large enough to handle it, testers designed and built one. Located at the northeast end of Tech Area 2, the centrifuge arm had a 20-foot radius; the pedestal sat in the center of a concrete pad partially enclosed by a wooden wall backed by an earthen berm. Completed within four months, the centrifuge was rocket-powered and exciting to operate.

1950s saw rapid expansion of capabilities

In 1953, work began further south on what is probably the most famous of Sandia's facilities — a rocket sled track. Designed for impact testing, the track was originally 1,000 feet long, on a relatively narrow rail gauge (4-foot, 8.5-inch separation of rails). Rocket sleds were mounted on the rails and large barricades were built at the track's ends for impact tests. Over time, imagination spurred additional uses for the track, including high-velocity rain erosion studies and acceleration tests.

During the 1950s, new component and system designs multiplied rapidly in the face of new design concepts, military needs, and technologies. To accommodate expanding environmental testing needs, Sandia extended its test equipment. In 1954, a hydraulic centrifuge was installed in Tech Area 3. With a 35-foot arm, it was thought to be the largest in the world at the time. A new vibration facility opened in 1955 and basic acceleration and shock capabilities were expanded with the addition of the 300-foot drop tower in 1957. The tower offered both free-fall and accelerated drop-test options. A second tower, 185 feet high, was added in 1960.

In 1958, another homemade dynamic test facility was built, the 26-inch air gun. Two 16-inch naval were guns were machined to 26 inches and flanged together at the muzzle for a total length of 92 feet. The facility offered either open-ended firing for impact testing or an air-powered piston operation. In response to specific weapon designs, the gun could simulate the spike-drag acceleration pulse of water entry.

The final test facility added to Tech Area 3 during this early history was the Radiant Heat Facility, created in 1960 to simulate the rapidly varying thermal environments of re-entry for missiles. In its first incarnation, the Radiant Heat Facility could reach temperatures of about 5,000 degrees F.

Test engineers described the very early years as largely cut-and-try testing. Military specifications defined specific tests to use for particular scenarios, including the machine on which to conduct the test. Malcomb Shannon described one shock test specification, indicating "they had defined a structure on which you could mount the test item and then you would drop it a given number of feet — say 3 feet — into a target of raked sand." There was little or no instrumentation and not much information was gathered. Like other test engineers, he was disparaging of this process, indicating that it only allowed comparison between two designs and "just separated the sheep from the goats." Improvement was needed.

The 1953 agreement between the Atomic Energy Commission and DoD outlining weapon design phases and delineating responsibilities during each assisted somewhat. The military retained responsibility for setting the military characteristics (MC) and the stockpile-to-target sequence (STS). The MCs established what the weapon had to do to meet its military mission. The STS indicated what steps the weapon would take and what it would encounter from storage until the moment it reached its target. The STS defined the normal environment for the weapon.

Bill Gardner, a World War II fighter pilot, came to Sandia in 1948 after serving as chief test pilot and supervisor of flight test at the Curtiss-Wright aircraft company. He was manager of the Test Laboratory department in 1956 and was promoted to the newly created position of director of Environmental Testing in 1960. In 1964, he moved on, but during his decade in Test, he was key to the move to tests designed to accommodate STS environments.

Bill aimed to refine the philosophy of environmental test to meet the needs of the design engineers most efficiently, introducing more discipline and rigor in test planning. The test engineers agreed, by 1959 creating an environmental test bank containing test characterizations suitable for different environments. Staff combed publications to gather data about particular environmental conditions and the behavior of products and materials in them. Stored on aperture cards, data was quickly retrievable.

Military authors of the STS could pull from the environmental test bank to describe the environments their weapons were likely to face. Designers could pick a test plan based on the understanding of those environments and what tests best explored them. Designers and test engineers began to test to standards, so that tests from different sites done at different times could be compared.

Testing for the 'critical weakness'

Bill advocated testing for the "critical weakness," defined as the crucial action of the component, the condition under which it absolutely had to work. Emphasizing the critical weakness allowed designers to confine testing to a critical path of environments. Testing to abnormal environments was discouraged as wasteful and unnecessary. This philosophy changed later as weapon safety during accidents became paramount. The demand for rigor did not change.

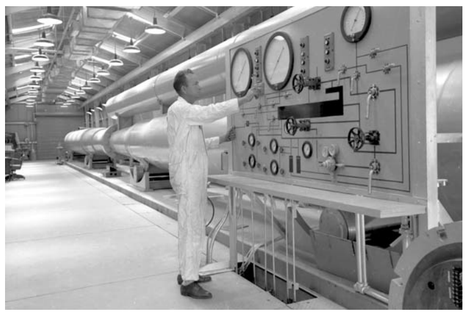
From its inception to the early 1960s, Sandia built a focused environmental test capability into one of the finest arrays of test facilities and test engineers anywhere, a foundation on which it continued to build in subsequent decades. It did so while defining and refining what it meant to practice such testing; negotiating the professional space between design engineering and test design by mastering the techniques of testing.

R. L. Myers at the firing panel and control console for the rocket sled track, 1958.

Barbara Rutherford keeping track of Tech Area 3's scattered personnel in 1958.

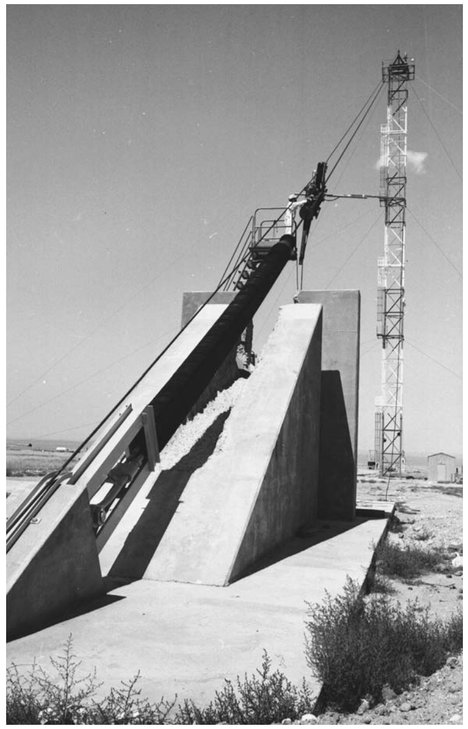
Wesley Haig and Charles Grassham checking test units at -20 degrees F in a climate chamber in Bldg. 828, 1951. Grassham also worked on the rocket-powered centrifuge in this period. Asked about it, he just smiles and shakes his head.

Paul Adams, supervisor of Area III Laboratory Division, left, and Parker Wallis, safety engineer, right, discuss a routine safety check after a test in the small explosives test area with L. A. Hitchcock, 1960.



Wilson Payne conducting a pressure test at the control panel of the air gun in Tech Area 3. The barrels of the gun were fabricated from two 16-inch naval cannon shipped to Sandia from Washington, D.C.

R. H. Schultz, manager of Environmental Research and Operations, explaining the Radiant Heat Facility to a tour from the annual field meeting of Atomic Energy Commission information officers, 1963.



The 185-foot-tall drop tower in Tech Area 3 was erected in the 1960s. Previously, a 300-foot drop tower had been built in 1957. The two towers gave testers both free-fall and accelerated drop-test options.

Secretary Chu to Sandians:

'Our country is counting on you . . .'

(Continued from page 1)

Chu's brief visit came two days after the State of the Union, in which the president urged Americans not to let other countries win the race for the future, but rather to "support the same kind of research and innovation that led to the computer chip and the Internet; to new American jobs and new American industries."

Several questions at the town hall echoed those concerns. One questioner told Chu he worried about how national laboratories could recruit talented people when budgets are tight and they're competing against Google and similar innovative companies.

Chu acknowledged Google employees make a lot of money, and that people would not get rich working on nuclear security or solutions to climate change. But he said people at the Labs work on things they really believe in, that are "cool and neat and really important to the United States and the world."

"Think about what you guys are doing," he said. "This is a good thing."

What will keep people at Sandia, or anywhere, is the quality of the teams they work on and "is the problem they're working on exciting, is the work interesting, does the manager shield them from some of the things the DOE tries to make them do?" Chu said.

The Energy Department, he said, wants to create an atmosphere where people are not "hassled" and where money saved on overhead can be reinvested into science.

"If they're working alone in a basement and all they have is a red stapler, that's not good," he said. After a slight pause, Chu laughed, and suggested the audience see the movie "Office Space."

The secretary said the labs, which he referred to as "intellectual powerhouses," give people freedom to explore, ability to work in cross-disciplinary teams, and time to develop an idea to the point private industry becomes interested.

"Some great achievements come from gradually pecking at it, pecking at it, pecking at it, and improving it," Chu said.

But he warned that a country that invents something does not have a claim on it forever. In the few years between the Wright brothers' flight and World War I, the United States lost its advantage in aviation, and today it's fighting to regain supremacy in the automotive and photovoltaic industries, he said.

He also said national laboratory innovations must get to market. A questioner followed up on that, asking how to move more technology to the commercialization stage.

While it's important not to give away patents, Chu said, it's also important to get intellectual property to the private sector by streamlining the process and making it more flexible. He also said each tech transfer must be judged on its merits, and that exclusive licenses should not be forbidden because, in many cases without one, no one picks up the patent.

If national laboratories can make tech transfer less of a hassle, "it enables me to go to Congress, and say, 'Hey, we are your financial future; fund us,'" he said.

Responding to a question about how to keep policies from changing with every federal administration, Chu said the President's Council of Advisors on Science and Technology has begun addressing the need for long-term planning through the first quadrennial review of energy technology and how to fund it. The plan is to be reviewed every four years, he said.

"It's going to be the basis going forward," said Chu, who pointed out the timescale to move from one form of energy to another typically runs a couple of decades to half a century.

"You want to have a long-term view," he said. "It's not clear what's actually going to win when it's in a research program."

The secretary urged Sandians to be proud of what they do. "Our country's counting on you guys to pull through on this one," he said, and drew laughter when he added, "And we hope that Congress will also count on you guys to pull through."

SOLAR ENERGY researcher Cliff Ho, left, explains to Energy Secretary Steven Chu, right foreground, the power of Sandia's heliostat field mirrors, which generate enough energy to burn through a thick sheet of steel. Looking on are Div. 8000 VP Rick Stulen left background, Rep. Martin Heinrich, and Albuquerque Mayor Richard Berry. (Photo by Randy Montoya)

DURING A TOUR of Sandia's National Solar Thermal Test Facility, Energy Secretary Steven Chu inspects newly refurbished mirror faces at the facility's heliostat field. Joining him, all seen here in reflection, are Div. 8000 VP Rick Stulen, left, Labs Director Paul Hommert, and Rep. Martin Heinrich. (Photo by Randy Montoya)

US poised for advanced manufacturing renaissance, Department of Energy Secretary Steven Chu says

The US is poised to reclaim a significant share of the global advanced manufacturing market, and the DOE national laboratories, including Sandia, are in the vanguard of the trend, Energy Secretary Steven Chu said during a news conference at Sandia/New Mexico in late January.

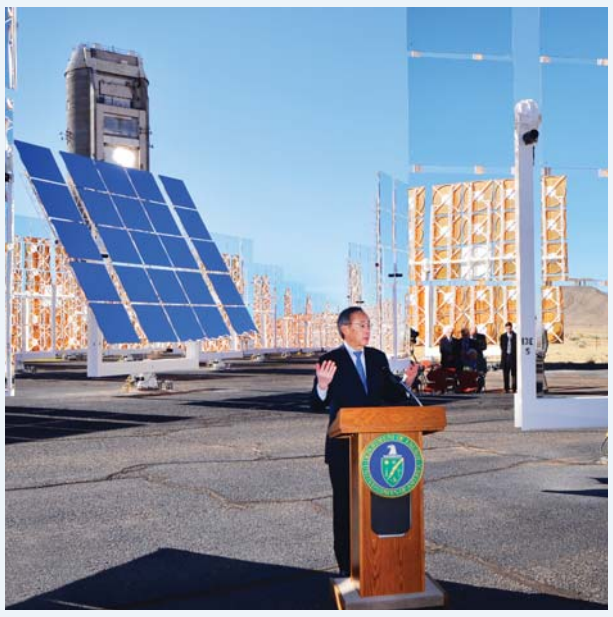
In a visit coming two days after President Obama's State of the Union in which job creation was a major theme, Chu was accompanied by Rep. Martin Heinrich, D-N.M., and Albuquerque Mayor Richard Berry.

The inventions and discoveries at places like Sandia, Chu said in remarks to members of the news media, are helping drive innovation in the private sector.

"And this is what the president was really talking about (in his State of the Union)," Chu said, "when he spoke about using the work of America's great research universities and national laboratories to spur innovation in the United States, to spur the kind of innovation that will serve as the foundation for jobs not only for today and tomorrow, but also for jobs that go well into the future."

During their visit, the delegation received briefings on Sandia's solar energy programs and participated in a roundtable discussion with several of Sandia's industry partners. Chu conducted a town hall discussion with members of the Sandia workforce before heading to the University of New Mexico to visit with students at a town hall there.

Noting that the global renewable energy market will likely grow from a current $260 billion a year to $400 billion a year within a decade and will continue to grow into the foreseeable future, Chu said, "This is a world market opportunity that the United States cannot leave behind. We have a choice; we can either discover, invent, and produce (renewable energy technology) here and export it, or (we can) import (these technologies). This is something where a lab like Sandia can make a whole lot of difference."



FOLLOWING A TOUR of Sandia's solar facilities and a roundtable with several Sandia business partners, Energy Secretary Steven Chu meets with members of the local news media. (Photo by Randy Montoya)

While the US is the world leader in generating innovative ideas, it has yielded leadership on the manufacturing side to other nations.

"We are used to having things invented in the United States," Chu said. "The silicon photocell was invented in the United States; the wind turbine was developed in the United States; lithium ion storage was developed in America; we have the basic patents in all these things, and yet today the majority of advanced batteries in the world are made in Asia."

Likewise, he noted, a majority of solar manufacturing has migrated to Asia and wind turbine manufacturing is now dominated by Denmark and Germany.

However, he added, given the innovative ideas coming out of Sandia, the other national labs, and the universities, "I see a resurgence of manufacturing in the United States. . . . It could very well be that within the decade we will be the dominant advanced battery manufacturer in the world; and not only in manufacturing, but in the continued improved development of them."

Chu acknowledged that there is "tremendous competition" worldwide in the solar manufacturing sector, but said he is confident the US can compete effectively in that arena, as well.

"Many of the most exciting technological developments (in renewable energy) and the most exciting advanced manufacturing developments are still in the United States," he said. "It is the president's intent, it is my intent, as it is the intent of the entire administration, to bring back advanced manufacturing to the United States, bring back those things in which we can compete with the world."

Sandia forges links to Historically Black Colleges

National Black History Month is observed each February

By Nancy Salem

Historically Black Colleges and Universities (HBCUs) were established in the US in the mid-1800s to give African Americans access to higher education during the time of racial segregation. The network of schools, mostly in the South, grew to 105, including public and private, two- and four-year, medical schools, and community colleges.

The schools flourished, and at one point about 90 percent of the African Americans enrolled in college were at an HBCU.

"They are very rich in history," says Chris Collins (5332), an electrical engineer who completed his undergraduate degree at Prairie View A&M University in Texas, was recruited to Sandia in 2002, and now recruits students from his alma mater and other HBCUs. "The schools have been a big success over the years."

Their status changed in 1954 with Brown v. Board of Education, the landmark US Supreme Court ruling that outlawed segregation in public schools. Enrollment at HBCUs dropped as many African Americans chose to attend mainstream colleges.

But HBCUs have continued to fill an important role in the education of African Americans and have been a source of exceptional talent for Sandia, says Chris, speaking on the eve of Black History Month, celebrated annually in February.

He says HBCUs provide a support structure not found at mainstream schools. "If you are in science or engineering at a majority school, there may be one or two African Americans in your class," he says. "At an HBCU, most of the students are African American and there is more of a support structure. You have support in studying, classes are smaller, and students are able to relate to each other and to some professors."

Chris says HBCUs produce African American scientists and engineers at a greater rate than mainstream schools. "They have a higher graduation rate of African Americans in STEM fields and are vital in recruiting efforts for companies," Chris says.

Sandia's relationship to HBCUs dates to the 1980s when the Labs participated in a DOE program to develop a pipeline of interns and, ultimately, employees from the schools, says Vanessa Miles (2951), who graduated from Prairie View in 1989 and later recruited Chris to Sandia. "There were six to 10 schools in the pipeline," Vanessa says. "That's how I was introduced to Sandia."

The program, which brought several people to the Labs, was discontinued in about 2000 after 15 years. "Most of us from Prairie View who came from the internship program loved it and wanted it to continue," Vanessa says. "Without the pipeline it is a stretch to get Prairie View grads to the Labs. There was no introduction."

Chris says the hiring of African Americans at Sandia declined when the program ended.

Vanessa, Chris, and others worked to continue the Sandia/Prairie View connection by visiting the school and presenting recruiting statistics to members of the corporate executive team. "We tried to keep the relationship alive. I went every semester to talk to students," Vanessa says. "We sold the Sandia story."

In 2007, Les Shephard, then a Sandia VP, agreed to support the Prairie View recruiting initiative as an executive-level champion. "That gave Prairie View a lot of visibility," Vanessa says. "The champion empowers the recruiting team with support and resources."

Steve Rottler (1000), VP of Science & Technology and Research Foundations, is the current champion.

SANDIA ENGINEER CHRIS COLLINS, left, returned to his alma mater, Prairie View A&M University in Texas, on a recruiting trip with colleagues from the Labs. Prairie View is in the US network of Historically Black Colleges and Universities. Chris and his fellow recruiters have established a close tie with Prairie View to encourage African American scientists to sign on at Sandia.

"We are seeking to develop a more strategic relationship with Prairie View A&M University because they are an important source of talent for our Laboratories," Steve says. "Beyond that, we see a more strategic relationship with Prairie View A&M as a means, over time, of building and strengthening research programs that are mutually beneficial."

Chris says there are about 15 Prairie View graduates at Sandia. He says the recruiting team of about nine, which works outside regular job responsibilities, hopes to expand the initiative to a second HBCU, North Carolina A&T State University.

"We need this to happen," Chris says. "We want to get to the point where the number of African Americans at Sandia, taking attrition into account, is increasing rather than declining. Of the African Americans on the technical staff at Sandia, a significant number have degrees from an HBCU."

Sandia tool determines value of solar photovoltaic power systems

SANDIA RESEARCHER Geoff Klise worked with Solar Power Electric™ to develop a tool that can be used to appraise photovoltaic installations on homes and businesses. (Photo by Randy Montoya)

By Stephanie Hobby

Consistent appraisals of homes and businesses outfitted with photovoltaic (PV) installations are a real challenge for the nation's real estate industry, but a new tool developed by Sandia and Solar Power Electric™ and licensed by Sandia addresses that issue. Sandia scientists, in partnership with Jamie Johnson of Solar Power Electric, have developed PV Value™, an electronic form to standardize appraisals. Funded by DOE's Office of Energy Efficiency and Renewable Energy, the tool will provide appraisers, real estate agents, and mortgage underwriters with more accurate values for PV systems.

"Previous methods for appraising PV installations on new or existing construction have been challenging because they were not using standard appraisal practices," says Geoff Klise (6926), the Sandia researcher who co-developed the tool. "Typically, appraisers develop the value of a property improvement based on comparable properties with similar improvements as well as prevailing market conditions. If there aren't PV systems nearby, there is no way to make an improvement comparison."

Before developing the PV Value tool, Geoff went through an appraising class focused on valuing energy-efficient features to better understand how to address the industry's needs. "When a PV system is undervalued or not valued at all, it essentially ignores the value of the electricity being produced and the potential savings over the lifetime of the system," Geoff says. "By developing a standard methodology for appraisers when comparables are not available, homeowners will have more incentive to install PV systems, even if they consider moving a few years after system installation."

The tool uses an Excel spreadsheet, tied to real-time lending information and market fluctuations, to determine the worth of a PV system. An appraiser enters such variables as the ZIP code where the system is located, the system size in watts, the derate factor — which takes into account shading and other factors that affect a system's output — tracking, tilt and azimuth, along with a few other factors, and the spreadsheet returns the value of the system as a function of a predetermined risk spread. The solar resource calculation in the spreadsheet is based on the PVWatts™ simulator developed by the National Renewable Energy Laboratory, which allows the spreadsheet to value a PV system anywhere in the US.

"With PV Value, appraisers can quickly calculate the present value of energy that a PV system can be estimated to produce during its remaining useful lifetime, similar to the appraisal industry's income approach," says Johnson. "Additionally, a property owner thinking about installing PV can now estimate the remaining present value of energy for their future PV system and what it could be worth to a purchaser of their property at any point in time in the event a sale of the property takes place before the estimated payback date is reached."

The tool is being embraced by the Appraisal Institute, the nation's largest professional association of real estate appraisers. "From my perspective as an appraiser, I see that this is a great tool to assist the appraiser in valuations, and it connects to the Appraisal Institute's recent Residential Green and Energy Efficient Addendum. It's an easy, user-friendly spreadsheet that will not bog the appraiser down with a lot of extra time in calculations, and if they fill out the addenda properly, they'll be able to make the inputs and come up with some numbers fairly quickly," says Sandy Adomatis, a real estate appraiser and member of the Appraisal Institute.

Although the tool is licensed for solar PV installations, it could be used for other large green features in a home that generate income, such as wind turbines. The spreadsheet, user manual, and webinar explaining the tool are available for download at http://pv.sandia.gov/pvvalue.

Solar Power Electric, located in Port Charlotte, Fla., is an electrical contracting and solar integration company specializing in the installation of commercial and residential photovoltaic systems.

Prestigious Asian American event comes to Albuquerque

By Nancy Salem

A few years ago, Al Romig, then executive VP at Sandia, took note of the annual Asian American Engineer of the Year award ceremony, a major event that draws hundreds of people to cities around the country. He asked a question: Why can't we bring it to Albuquerque?

Al left Sandia for a VP position at Lockheed Martin's famed Skunk Works, but his question remained and has now been answered. The 2012 Asian American Engineer of the Year (AAEOY) celebration will be held in Albuquerque March 2-3 at the Marriott Uptown.

"It is a great honor to host this event," says Eliot Fang (1524), the Sandia engineer who chairs the AAEOY 2012 Executive Committee. "This is a national award ceremony with technical seminars, career information, and a formal banquet. It's usually held in larger cities."

Sandia and Lockheed Martin Corp. are Title Sponsors of AAEOY 2012. The program recognizes outstanding Asian American professionals in science and engineering for their technical achievement and public service. It was launched in 2002 and is organized by the Chinese Institute of Engineers-USA (CIE-USA), founded in 1917.

Nine Sandians have been honored

In the past 10 years, 181 people have received the AAEOY Award and 27 the special Distinguished Award. Honorees include eight Nobel laureates, academics, key corporate executives, and an astronaut. Nine Sandians have received the award since 2002.

"We are excited about the opportunity to help host this year's Asian American Engineer of the Year event," says Kim Sawyer, Sandia executive VP and deputy Laboratories director. "Sandia's Asian Leadership and Outreach Committee (ALOC), which represents 288 Asian Americans at the New Mexico lab, is planning an exceptional event that will reach out to a national audience."

Kimberly Admire, VP of Diversity, Inclusion and Equal Opportunity Programs at Lockheed Martin Corp., says AAEOY "provides an opportunity to recognize talented Asian American men and women for their contributions in STEM (science, technology, engineering, and mathematics) and leadership.

"Lockheed Martin is honored to support the AAEOY awards organized by the Chinese Institute of Engineers-USA," she says. "We are delighted this year's event is being held in Albuquerque, and we look forward to hosting some of the activities for AAEOY 2012."

CIE-USA has seven chapters — Dallas, New York, New Mexico, Overseas Chinese Environmental Engineers and Scientists Association, San Francisco, Seattle, and Southern California — and is governed by a national council made up of rotating delegates. The current chair is Yung Sung Cheng of the Lovelace Respiratory Research Institute in Albuquerque.

Seventeen people from across the US will be recognized at this year's awards banquet. About 450 attendees are expected. Three Sandians are on the list of honorees: Hongyou Fan (1815), Ming Lau (8230), and Rekha Rao (1514). There will also be a Distinguished Lifetime Achievement Award and a Distinguished Science & Technology Award. Nominations come from corporations, academics, government, and scientific institutions. A review committee from the CIE-USA New Mexico Chapter selected the winners based on specific criteria.

Small chapter, big ambitions

The New Mexico chapter put in its application to host the AAEOY several years ago. The request came up at the 2010 CIE-USA National Council meeting in New York. Council members had to decide whether Albuquerque had the resources to be the host city.

"There was some debate," says Chui Fan Chen Cheng (2661), who had been asked by Al to explore the possibility of Albuquerque being a host. "We are a small chapter. We had never hosted a major event. Some people questioned whether we could do it."

When Albuquerque got the nod, the local chapter formed the 2012 AAEOY Executive Committee headed by Eliot, an AAEOY honoree in 2006.

Chui had polled chapter members on their interest, and knew there was enough manpower. Eight subcommittees worked on tasks ranging from fundraising and publicity to logistics and information technology. In all, about 75 people have been involved in planning the event, which has numerous industry partners and sponsors.

The subcommittees are staffed by Sandians as well as engineers from Intel, the Lovelace institute, the University of New Mexico, and other organizations.

Shows Sandia's diversity, inclusion

"This has been a great experience," Eliot says of heading up the planning. "We have two DOE national labs in New Mexico. We have an Air Force Research Lab. We have Intel. We have Emcore. We have research parks. We have universities. People don't realize New Mexico plays a critical role in advancing the future of science and technology due to the institutions we have here and the work we do."

PLANNING TEAM —Sandians (left to right) Chui Fan Chen Cheng (2661), Eliot Fang (1524), and Tammy Strickland (9512) go over plans for the 2012 Asian American Engineer of the Year Award meeting and banquet to be held March 2-3 at the Albuquerque Marriott Uptown. "This has been a great experience," says Eliot, chair of the event's Executive Committee. (Photo by Randy Montoya)

Tammy Strickland (9512), Sandia executive liaison for AAEOY 2012, chair of the event's hospitality subcommittee, and head of the ALOC, says Asian Americans are not numerous in Albuquerque, so an event of this stature brings visibility to that community. "And it shows that Sandia has diversity and inclusion, and that the executives support that," she says.

Chui, who chairs the fundraising subcommittee, says the planning and hard work have paid off. She says the two-day event will feature a technical tour of Sandia for the award event participants; a pre-award dinner at the Albuquerque International Balloon Museum; a cultural tour of Old Town, the Indian Pueblo Cultural Center, and the Atomic Museum; a seminar; a VIP reception sponsored by Sandia and Lockheed Martin; and the award ceremony and banquet at the Marriott Uptown. Sandia President and Labs Director Paul Hommert is the keynote speaker.

"The technical tour of Sandia, hosted by Sandia and Lockheed Martin Corp., will showcase some of Sandia's exciting national security work," Kim says.

Eliot says hosting AAEOY helps promote Sandia's image in science and technology leadership.

"It's a big deal, and we feel we have a lot to offer in this event," Chui says. "We can introduce people to the Southwest. And it's a showcase opportunity for Sandia. We have a lot of technology to showcase."

Sandia's focus on efficiencies is paying dividends

Sandia continues to make strides in identifying and implementing process efficiencies throughout the Laboratories, resulting in necessary funding to reinvest in critical capabilities and meet obligations, including the pension.

In 2010, Sandia President and Laboratories Director Paul Hommert spoke to employees about the need to ensure the solvency of Sandia's pension plans in the face of unprecedented financial challenges, due in part to constrained federal budgets, market uncertainties, and rising health care costs. Strategies to ensure solvency of the pension included implementing efficiencies, managing the fringe rate, and pension benefit design changes.

The strategies for ensuring the solvency of the pension plan have been successful. Before changes were made in 2010, Sandia was faced with making contributions of $1,950 million between 2011 and 2020. That has been reduced to $1,100 million by restructuring the benefit design, saving $400 million, and through a carefully managed investment strategy, saving an additional $450 million.

Through the elimination of inefficiencies, Sandia has been able to fund the necessary contributions. "It's nice to see our plan paying off. We've been able to demonstrate to our customers that we're managing our pension issues," Paul says. "Additionally, the effort aligns with our strategic objective to 'lead the complex as a model 21st century government-owned, contractor-operated (GOCO) national laboratory.'"

"To achieve this strategic objective, Sandia is faced with a leadership challenge to fundamentally change the way Laboratory personnel think and the way we manage our approach to delivering products and services to our customers," says Kim Sawyer, deputy Laboratories director and executive VP for Mission Support. "We can build customer confidence by providing excellent management of operations and services in an easy, effective, and cost-efficient manner."

In addition to meeting pension obligations, additional funding is needed for critical infrastructure, including facilities, laboratory equipment, and new computing capabilities.

"We have made a corporate commitment in our strategic objectives to a learning, inclusive, and engaging environment for our people," Paul says. "Investing in our infrastructure and capabilities is imperative to maintaining an environment which motivates our workforce."

For FY12, Sandia has already achieved a $30 million commitment in savings throughout the Laboratories for future obligations and investments, and Paul says he is confident there will be additional savings beyond that amount over the coming year.

The overall approach to efficiencies consists of right-sizing services, including consolidating or eliminating duplicate functions, services or capabilities; utilizing IT to streamline operations and reduce labor costs; reducing discretionary purchases, travel, and chargebacks; and streamlining the purchase and delivery of products and services. While the effort to create efficiencies is important, Kim states the approach must also allow the Labs to remain flexible and not impede productivity.

The Labs has targeted nearly 40 "areas of opportunity" that are ripe for achieving additional efficiencies. The areas include implementing greater standardization; space management; printers, copiers and data centers; travel costs and fee services; office supplies; training; and ECAD design tools. Sandia is applying best practices and Lean Six Sigma quality management principles to help prioritize the opportunities based on projected return on investment and customer satisfaction.

Managing overhead rates is important to ensure continued customer affordability. Leadership's goal is to reduce overhead for existing mission work and help in Sandia's ability to develop new programs. Sandia had originally planned for no growth in overhead rates between FY11 and FY12. However, as a result of these efficiency efforts, Sandia will actually be able to reduce overhead rates, which results in more money to perform more technical work for our customers.

Kim says leading the complex as a model 21st century GOCO requires both immediate and longer-term change throughout the Laboratories. "There are many opportunities to improve our performance, efficiency, and effectiveness," she says. "Realizing these opportunities requires working partnerships and shared responsibilities between Mission Support and Mission Delivery. Together, we'll make prudent, common-sense changes that help the Laboratories meet our objectives."

Award-winning engineer followed path of nonproliferation

By Nancy Salem

Late last fall, the national Career Communications Group, an advocate for corporate diversity, sent out a call for nominations for its 2012 Black Engineer of the Year suite of awards as part of its national STEM achievement program. The call landed on the desk of Sandia's Rodney Wilson, director of Center 6800, a week before nominations were due.

Not only was the deadline close, the suggested length of time for putting the 80-page nomination packet together was 45 days. But Rodney had a candidate in mind and didn't want to miss the chance to recognize his work.

ADAM WILLIAMS with his wife, Emily, and sons Josiah and baby Samuel. "Albuquerque has been a great place to build a family," Adam says.

Adam Williams (6812) joined 6800, the Nonproliferation and Cooperative Threat Reduction Center, in early 2008 as a member of the International Nuclear Security Engineering Group.

"Adam's name jumped right to mind. I didn't think twice about it," Rodney says. "He makes his presence known and demonstrates an immediate sense of leadership. I traveled to the Mideast with him and observed his ability to become a leader in complex cultural, technical situations. He has been able to lead a very diverse set of projects while raising a family, contributing to the community, hosting student interns, and on and on and on. He is someone who has embraced the culture and diversity of this laboratory."

Rodney quickly put together the nomination.

The effort paid off. Rodney learned in late November that Adam was named 2012 Most Promising Engineer-Government. The Black Engineer of the Year Awards (BEYA) recognize some of the nation's best and brightest engineers, scientists, and technology experts. Adam will receive his award at the BEYA conference Feb. 16-18 in Philadelphia.

"Honestly, it was an honor to be nominated," Adam says. "I measure success by being able to come home, look in the mirror and say I did all I could to do my best at the tasks in front of me. To have my efforts acknowledged by my colleagues and management is encouraging and inspiring."

Adam's path to Center 6800 was a bit unconventional.

The Fort Hood, Texas, native was a freshman in the mechanical engineering program at Texas A&M University (TAMU) when he heard a talk by James Olson of TAMU's Bush School of Government and Public Service. Olson had recently retired from the CIA. "His talk was like something out of a Jason Bourne movie, but real," Adam says. "It was interesting and engaging to say the least."

ON A WORK-RELATED TRIP to the Mideast in November 2009, Adam Williams took a spin on a camel near the Pyramids in Egypt. "As fast as a horse, tall as a double-decker bus, as gentle as your favorite dog. But watch out, they spit!" Adam says of the ride.

At the end, Olson asked the audience three questions: Are you willing to potentially put service to your country ahead of yourself? Are you willing to travel around the world and do work that will never get recognized or acknowledged? Are you willing to not be able to share the details of your career with your friends and family for the rest of your life? Olson said anyone who answered yes to all three should talk to him. "I thought, 'That's me,'" Adam says. "So I met with him."

Olson became a mentor to Adam and guided him to a career in international relations. "He opened my eyes to this big thing called the world and its complex geopolitical interactions," Adam says. "There are many events going on all over the world, and they all matter."

He completed his bachelor's degree in mechanical engineering and enrolled in the master's program in international affairs at the Bush school. "I realized my interests revolved around big, global problems," he says. "Graduate school was a way to see if IR (international relations) was where I really wanted to be."

Adam came across the concept of nonproliferation, and a light went on. "Learning about nuclear nonproliferation was akin to digging in the sand and hitting something solid," he says. "I wanted to keep digging to find out more. Peeling back its layers and complexities and intricacies is fascinating. I got my master's and decided that nonproliferation was the direction I wanted to go."

Adam presented his undergraduate thesis in late 2004 to an advisory panel that included Sandia's Dori Ellis (4000). She followed him into the hall and gave him her card. "Call me," she said. "I want to give you a job."

Four years later, after completing his master's, Adam called. He was hired at Sandia within weeks.

His official title is international security technical systems analyst. "My job is to help develop creative solutions to the vast array of nonproliferation problems," says Adam, whose work takes him to countries around the world. "I really like it. I've been very blessed to have outstanding management, wonderful co-workers, and a set of projects that are challenging — but also will ultimately make the world a safer, more secure place."

Adam and his wife, Emily, have two boys, Josiah, 3, and Samuel, 4 1/2 months. "Albuquerque has been a great place to build a family," he says. "Being a Texan, it's difficult to imagine myself thriving outside of Texas, but Albuquerque has provided the professional foundation, friendships, church, home, and atmosphere that make planting roots here very satisfying."

T-41 has gone to the dogs

Emergency Management personnel and Matt Pepper, director of Bernalillo County Animal Care, attempt to rescue a mother pit bull/heeler cross and her newborn puppies from their den under T-41, just outside Tech Area 1. It was believed the mother gave birth the week prior. Kirtland police, Sandia's Emergency Management, and Sandia's Environmental Management staff have been seeing to their care until mom and babies could be safety moved.
(Photos by Randy Montoya)